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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,700	01/10/2004	Christine M. Greiser	A3182Q-US-NP	3437

7590 07/18/2006

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EXAMINER
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FIDLER, SHELBY LEE

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/755,700	<b>Applicant(s)</b> GREISER ET AL.	
	<b>Examiner</b> Shelby Fidler	<b>Art Unit</b> 2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 12 and 28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-27 and 29-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/6/2006</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Allowable Subject Matter*

The indicated allowability of claims 7, 8, 23, and 24 is withdrawn in view of the newly discovered reference(s) to Hoisington (US 5757400). Rejections based on the newly cited reference(s) follow.

### *Claim Objections*

Claim 8 recites the limitation "each column" in line 2. There is insufficient antecedent basis for this limitation in the claim. For the purpose of rejection, Examiner assumes that "each column" refers to the "columnar arrays."

Claim 18 is objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Line 2 recites, "the first columnar arrays of drop generators comprise first linear arrays of drop generators," where the parent claim 17 recites "a first linear array of side by side substantially mutually parallel first columnar arrays of ink drop generators." It is confusing how the first linear array can comprise the first columnar arrays, and the first columnar arrays can comprise the first linear array. The same argument applies for "second linear array" and "second columnar arrays." For the purpose of rejection, Examiner assumes that the "first linear arrays" of claim 18 are sub-columns.

Claim 24 recites the limitations "the first linear sub-column" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. For the purpose of rejection, Examiner assumes that this limitation refers to the "first sub-column."

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8, 10, 11, 13, 14, 16-24, 26, 27, 29, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoisington (US 5757400) in view of Kanda et al. (US 6502921 B2).

**Hoisington teaches the following:**

**\*regarding claims 1 and 11, a drop emitting device comprising:**

a linear array (e.g. ink jet array 23 of Fig. 2) of side by side substantially mutually parallel columnar arrays (see Drawing A below) of ink drop generators (ink jets 40, Fig. 3), the linear array extending along an X-axis (Drawing A);

each columnar array comprised of a first sub-column of ink drop generators (sub-column A, Drawing A) that is interleaved with a second sub-column of ink drop generators (sub-column B, Drawing B);

wherein the first sub-columns of ink drop generators are fluidically coupled to a first ink manifold (supply duct 42, Fig. 3); and

wherein the second sub-columns of ink drop generators are fluidically coupled to a second ink manifold (supply duct 43, Fig. 3)

**\*regarding claim 2, the columnar arrays of drop generators comprise linear arrays of drop generators (sub-columns A and B, Drawing A)**

**\*regarding claims 3, 13, 19, and 29,** the drop generators comprise piezoelectric drop generators (col. 2, lines 32-38)

**\*regarding claims 4, 14, 20, and 30,** the drop generators respectively include an ink pressure chamber (ink pumping chamber 48, Fig. 4), an outlet channel (orifice passage 49, Fig. 4), and a nozzle (orifice 51, Fig. 4)

**\*regarding claims 5 and 21,** the first ink manifold (supply duct 42) receives ink of a first color (e.g. that of reservoir 27, col. 3, lines 15-19 and col. 4, lines 9-13), and the second ink manifold (supply duct 43) receives ink of a second color (e.g. that of reservoir 27, col. 3, lines 15-19 and col. 4, lines 9-13)

**\*regarding claims 6 and 22,** the first ink manifold and the second ink manifold receive ink of a same color (col. 4, lines 9-13)

**\*regarding claims 7 and 23,** a plurality of finger manifolds (branches 44 and 45, Fig. 3) wherein each first sub-column of drop generators is fluidically connected to a first finger manifold (sub-columns A connected to branches 44, Drawing A and Fig. 3) and each second sub-column of drop generators is fluidically connected to a second finger manifold (sub-columns B connected to branches 45, Drawing A and Fig. 3)

**\*regarding claim 8,** a plurality of side by side finger manifolds (branches 44 and 45, Fig. 3), wherein as to each column the first sub-column of drop generators is fluidically connected to a first finger manifold (sub-columns A connected to branches 44, Drawing A and Fig. 3) and the second sub-column of drop generators is fluidically coupled to a second finger manifold (sub-columns B connected to branches 45, Drawing A and Fig. 3) that is adjacent the first finger manifold (Fig. 3)

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**\*regarding claims 10, 16, 26, and 32**, the drop generators are implemented in a laminar stack of plates (col. 2, lines 38-40 and col. 4, lines 17-18)

**\*regarding claim 17**, a drop emitting device comprising:

a first linear array (e.g. ink jet array 23 of Fig. 2) of side by side substantially mutually parallel first columnar arrays (see Drawing A) of ink drop generators (ink jets 40, Fig. 3), the first linear array of first columnar arrays of ink drop generators extending along a X-axis (Drawing A);

each first columnar array of ink drop generators comprised of a first linear sub-column of ink drop generators (sub-column A, Drawing A) that is interleaved with a second linear sub-column of ink drop generators (sub-column B, Drawing A);

wherein the first linear sub-column of ink drop generators is fluidically coupled to a first ink manifold (supply duct 42, Fig. 3);

wherein the second linear sub-column of ink drop generators is fluidically coupled to a second ink manifold (supply duct 43, Fig. 3);

a second linear array (e.g. ink jet array 24 of Fig. 2) of side by side substantially mutually parallel second columnar arrays (see Drawing A) of ink drop generators (ink jets 40, Fig. 3), the second linear array of side by side substantially mutually parallel second columnar arrays of ink drop generators extending along the X-axis (Drawing A), and the second linear array of columnar arrays being adjacent the first linear array of first columnar arrays (Fig. 2);

each second columnar array comprised of a third linear sub-column of ink drop generators (sub-column A to array 24, Drawing A) that is interleaved with a fourth linear sub-column of ink drop generators (sub-column B to array 24, Drawing A);

wherein the third linear sub-column of ink drop generators is fluidically coupled to a third ink manifold (supply duct 42 to array 24, Fig. 3); and

wherein the fourth linear sub-column of ink drop generators is fluidically coupled to a fourth ink manifold (supply duct 43 to array 24, Fig. 3)

**\*regarding claim 18**, the first columnar arrays of drop generators comprise first linear arrays of drop generators (sub-columns A and B to array 23, Drawing A), and wherein the second columnar arrays of drop generators comprise second linear arrays of drop generators (sub-columns A and B to array 24, Drawing A)

**\*regarding claim 24**, a plurality of side by side finger manifolds (branches 44 and 45, Fig. 3), wherein as to each first columnar array the first linear sub-column of drop generators is fluidically connected to a first finger manifold (sub-columns A of array 23 are connected to branches 44, Drawing A and Fig. 3) and the second sub-column of drop generators is fluidically coupled to a second finger manifold (sub-columns B of array 23 is connected to branches 45, Drawing A and Fig. 3) that is adjacent the first finger manifold (Fig. 3)

**\*regarding claim 27**, a drop emitting device comprising:

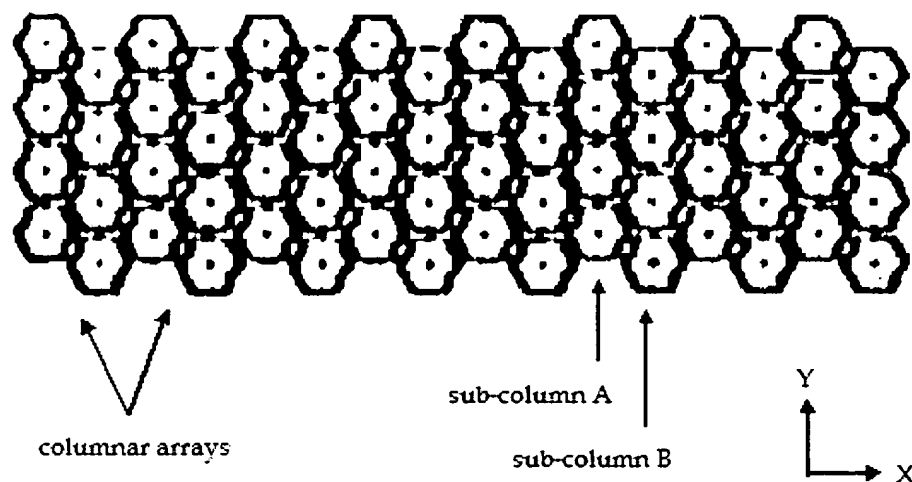
a linear array (e.g. ink jet array 23 of Fig. 2) of side by side substantially mutually parallel columnar arrays (see Drawing A) of ink drop generators (ink jets 40, Fig. 3), the linear array extending along an X-axis (Drawing A);

a second linear array (e.g. ink jet array 24 of Fig. 2) of side by side substantially mutually parallel columnar arrays (see Drawing A) of ink drop generators (ink jets 40, Fig. 3), the second linear array of side by side substantially mutually parallel second columnar arrays of ink drop generators extending along the X-axis (Drawing A); and

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the second linear array of columnar arrays being adjacent the first linear array of first columnar arrays (Fig. 2);

wherein each first columnar array is comprised of first and second linear sub-columns of ink drop generators (sub-columns A and B to array 23, Drawing A) that are interleaved with each other (Fig. 3), and each second columnar array is comprised of third and fourth linear sub-columns of ink drop generators (sub-columns A and B to array 24, Drawing A) that are interleaved with each other (Fig. 3)



Drawing A: Ink jet array from Fig. 2 of Hoisington, edited for clarification

Hoisington does not expressly teach the following:

- \*regarding claims 1 and 11, the columnar arrays being oblique to the X-axis
  - \*regarding claims 10, 16, 26, and 32, the plates are metal
  - \*regarding claim 17 and 27, the first columnar arrays being oblique to the X-axis;
- the second columnar arrays being oblique to the X-axis;



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the linear arrays are adjacent along a second axis orthogonal to the X-axis;

**Kanda et al. teach the following:**

**\*regarding claims 1 and 11**, the columnar arrays being oblique to the X-axis (e.g. Fig. 6, where the vertical axis reads as the “X-axis”)

**\*regarding claims 10, 16, 26, and 32**, the plates are metal (col. 4, lines 47-48)

**\*regarding claims 17 and 27**, the first columnar arrays being oblique to the X-axis (e.g. nozzle columns 11 of Fig. 5);

the second columnar arrays being oblique to the X-axis (e.g. nozzle columns 12 of Fig. 5);

the linear arrays are adjacent along a second axis orthogonal to the X-axis (horizontal axis of Fig. 5);

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize oblique columnar arrays into Hoisington’s invention. The motivation for doing so, as taught by Nakamura et al., is to reduce crosstalk and elevate refilling speed (col. 7, lines 22-38).

Claims 9, 15, 25, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoisington (US 5757400) as modified by Kanda et al. (US 6502921 B2), as applied to claims 1 and 11 above, and further in view of Ericksen (US 5079571).

**Hoisington as modified by Nakamura et al. do not expressly teach the following:**

**\*regarding claims 9, 15, 25 and 31**, the drop generators receive melted solid ink

**Ericksen teaches the following:**

**\*regarding claims 9, 15, 25, and 31**, the drop generators receive melted solid ink

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At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize melted solid ink into the invention of Hoisington as modified by Kanda et al. The motivation for doing so, as taught by Ericksen, is that the two types of inks are art-recognized equivalents (col. 3, lines 65-67).

*Response to Arguments*

Applicant's arguments with respect to claims 1-32 have been considered but are moot in view of the new ground(s) of rejection. See above rejections Hoisington (US 5757400) in view of Kanda et al. (US 6502921 B2), and Hoisington (US 5757400) as modified by Kanda et al. (US 6502921 B2) and further in view of Ericksen (US 5079571).

*Communication with the USPTO*


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelby Fidler whose telephone number is (571) 272-8455. The examiner can normally be reached on MWF 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SF 7/13/06

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